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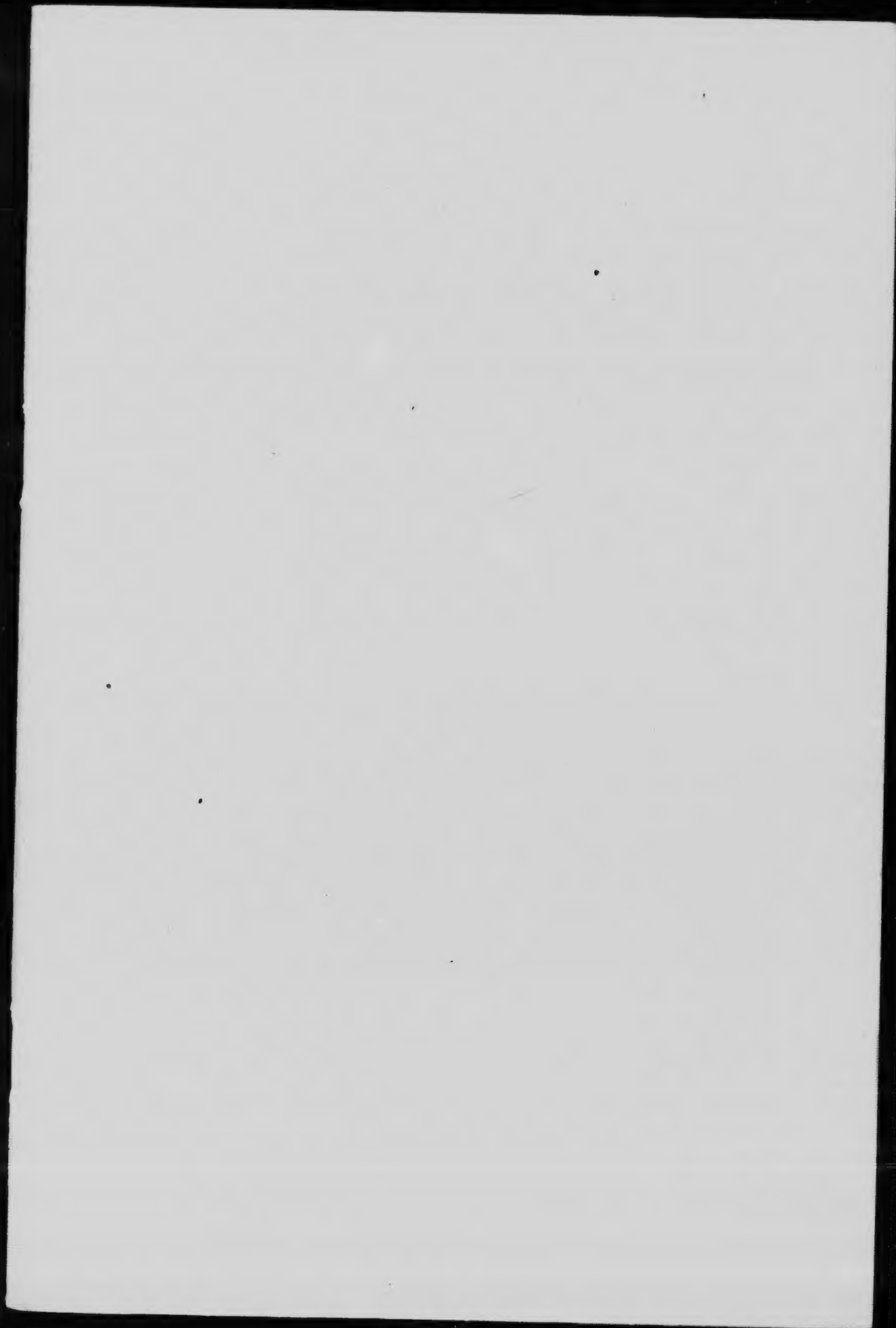
FORESTRY BRANCH—BULLETIN No. 42.

R. H. CAMPBELL, Director of Forestry.

CO-OPERATIVE
FOREST FIRE PROTECTION

GEO. E. BOTHWELL, B. Sc. F.

OTTAWA
GOVERNMENT PRINTING BUREAU
1914





Fire-ranger Patrolling on Horse-back.

Courtesy St. Maurice F.P.A.



Fire-ranger in Camp.

Courtesy St. Maurice F.P.A.

DEPARTMENT OF THE INTERIOR, CANADA.

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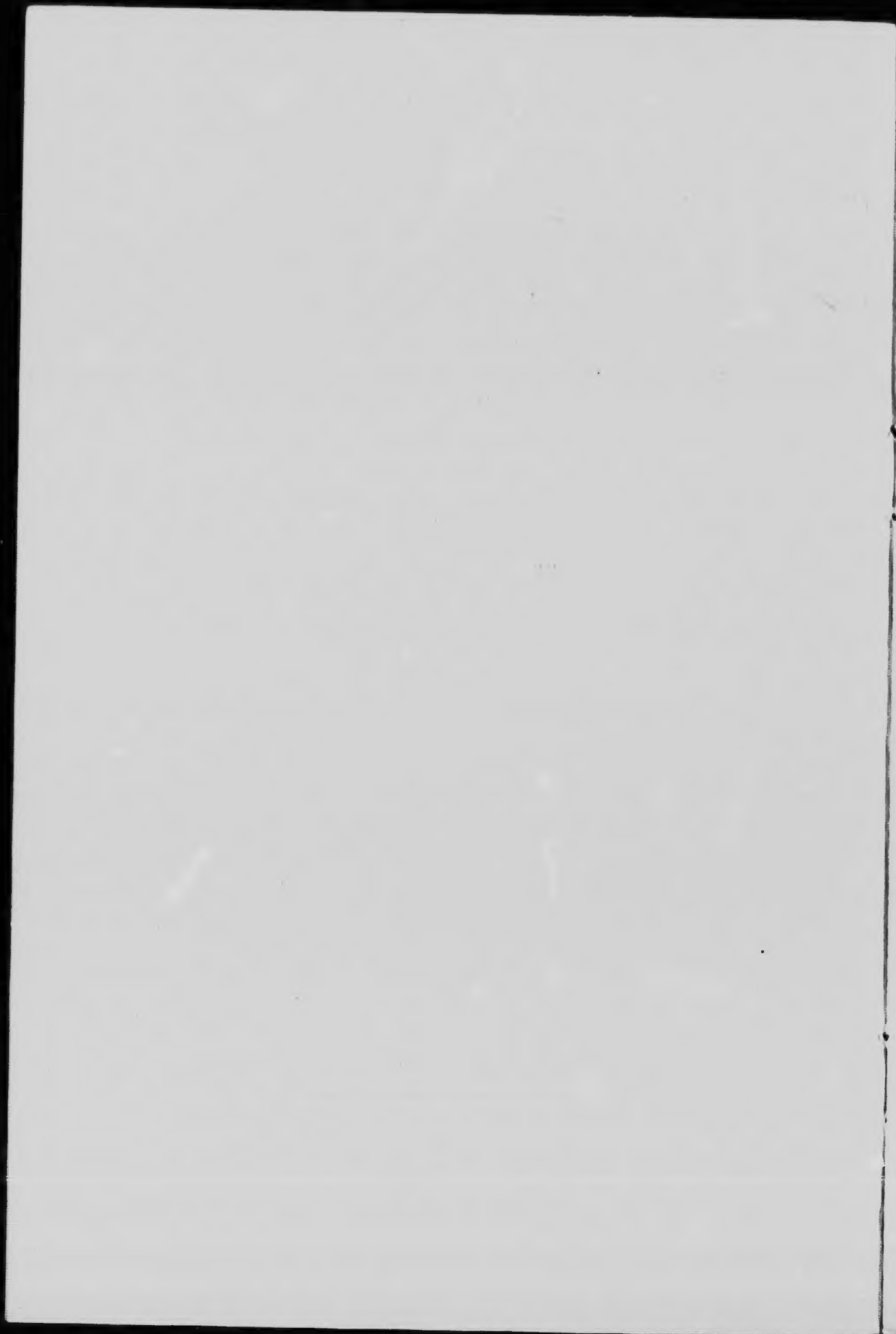
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1914



DEPARTMENT OF THE INTERIOR,

FORESTRY BRANCH,

OTTAWA, August 7, 1913.

SIR,—I submit herewith a bulletin prepared by Mr. G. E. Bothwell, describing the development of co-operative forest fire protective associations in America. The development and work of the St. Maurice Fire Protective Association in the Province of Quebec is especially referred to. The organization of this association has been one of the most important advances in connection with forestry work in Canada during the last few years. The exposition of the character and purpose of the association that has been prepared by Mr. Bothwell should have an important influence in awakening private owners of timber land to the necessity and also the possibility of effective protection of their timber from forest fires.

I would recommend that this report be printed as Bulletin 42 of this Branch.

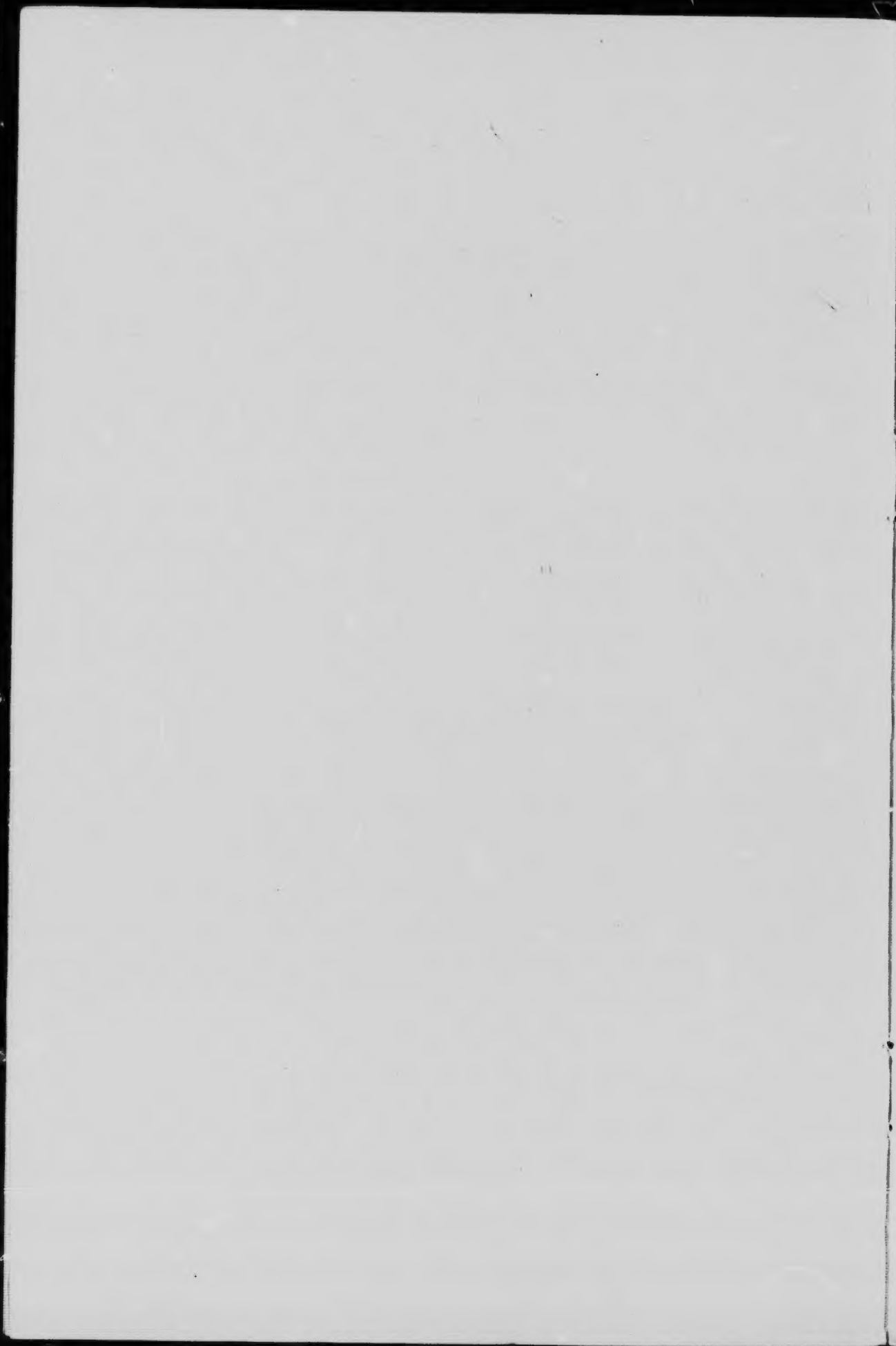
Respectfully submitted,

R. H. CAMPBELL,

Director of Forestry.

W. W. CORY, Esq., C.M.G.,

Deputy Minister of the Interior,
Ottawa.



DEPARTMENT OF THE INTERIOR,

FORESTRY BRANCH,

OTTAWA, August 5, 1913.

SIR,—I beg to submit herewith a report of the investigations made by me regarding the growth of forest fire protective associations among the lumbermen of America.

I have treated the St. Maurice Fire Protective Association in greater detail, because it is the only Canadian association of its kind yet in existence, because it most nearly typifies conditions in eastern Canada, and because it is considerably above the average of such associations in the efficiency and cheapness of its forest fire protective system.

Respectfully submitted,

G. E. BOTHWELL.

R. H. CAMPBELL, Esq.,

Director of Forestry,

Ottawa, Ont.

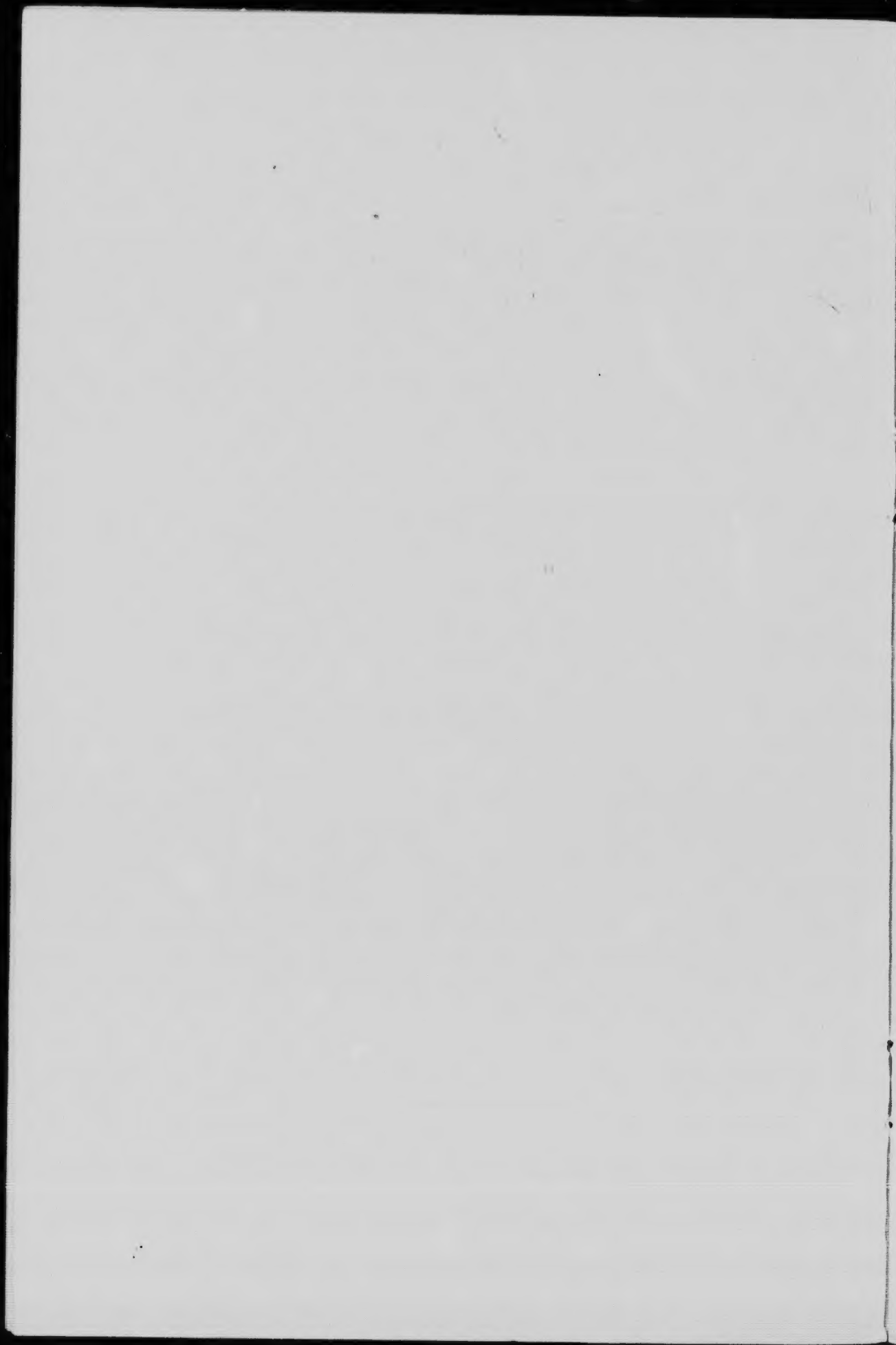
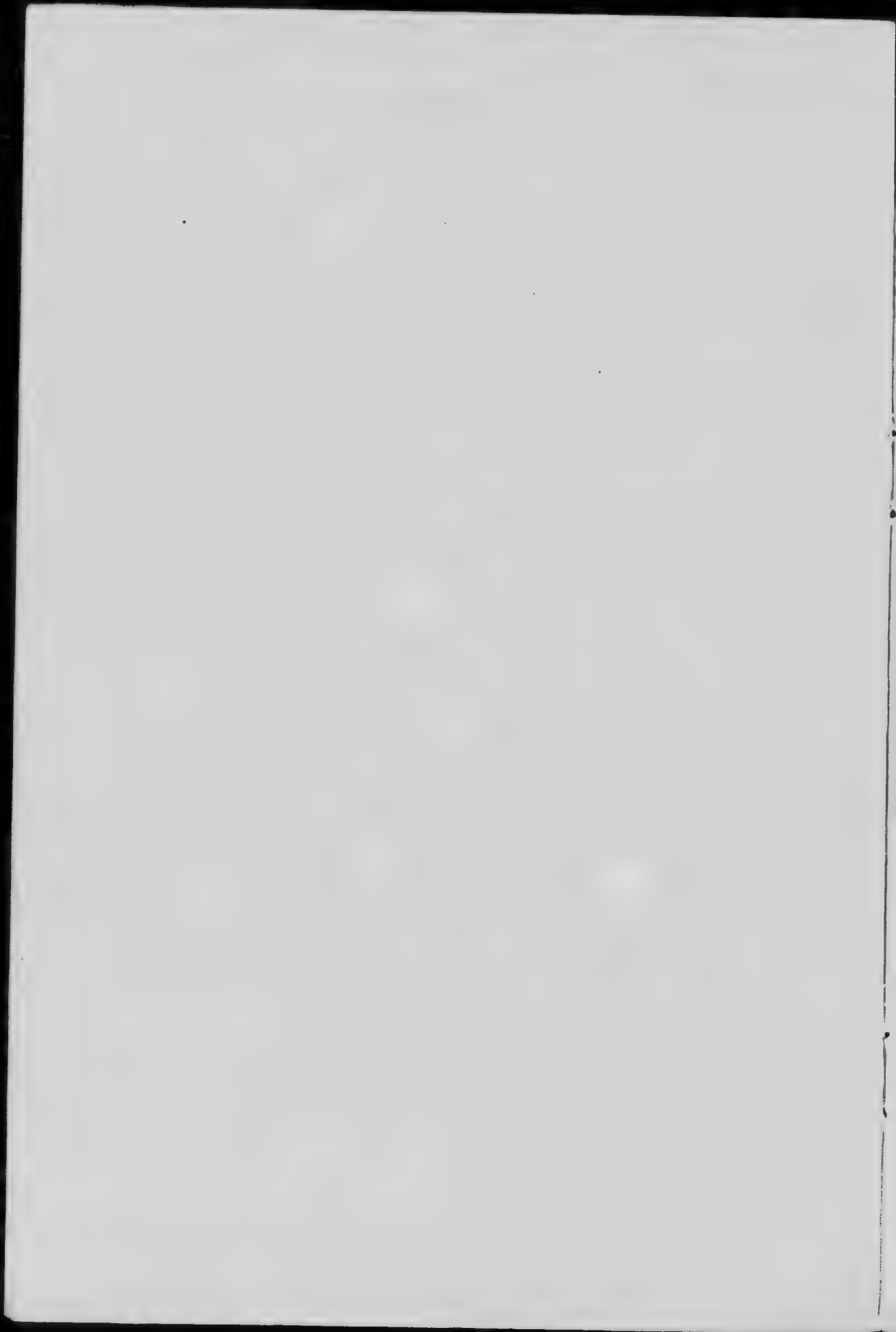


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CO-OPERATIVE FOREST FIRE PROTECTION

A BRIEF HISTORY OF THE MOVEMENT IN CANADA AND THE UNITED STATES, WITH SPECIAL REFERENCE TO THE ST. MAURICE FIRE PROTECTIVE ASSOCIATION.

Co-operation in one form or another is world-old, but co-operative fire-protection among the lumbermen of America is a present-day development, arising to fulfil a pressing need, namely, the adequate protection of the forests from fire. The tardy realization of this need by many of the lumbermen made it necessary, at one time, for the public to legislate in order to protect the forest from the carelessness of these lumbermen, and more or less adequate regulations regarding the patrol of timber limits were put into force with varying effectiveness. But, with the growing value of the existing stands and the prospective growth in value of the potential timber on cut-over areas, this seeming inertia among lumbermen in the matter of fire-protection no longer requires legislative stimulus. Indeed, in many cases the lumbermen themselves have recently found it necessary to co-operate in order to protect the forest from the carelessness of the public.

Government regulation of fire-protection on private forests has been characterized in America by considerable laxity of administration. The scattered patrol required by law on timber limits, even if maintained, was not sufficient to insure safety from fire. The more progressive lumbermen, who realized the damage caused by fire, protected themselves by supplementing this patrol with additional fire-rangers and up-to-date equipment, but even the largest limit-holders found that, acting independently, they could not afford to emulate the highly efficient and costly fire-fighting machine secured on national forests by a nation's co-operation. It became necessary for lumbermen to co-operate also in order to eliminate irresponsibility among smaller holders, to secure uniformity of patrol, and to obtain the greater efficiency of systematic organization and greater influence alike over careless lumbermen and careless public.

THE BEGINNING OF CO-OPERATIVE FIRE-PROTECTION.

Although in Canada the original idea of co-operative protection among lumbermen was conceived independently of American influence, yet in the subsequent working out of its organization, the Canadian association followed closely in the steps of the older fire-protective associations in the United States, and as these latter indicate better the growth of the co-operative idea, a brief outline of their development is essential.

The co-operative forest-protection movement in America originated in 1906, when a group of northern Idaho timber-owners associated themselves under the name of the Cœur d'Alene Timber Protective Association, in order to patrol their lands more efficiently than they could do as individuals, and agreed to a *pro rata* assessment upon an acreage basis. Officers were elected and a treasurer placed under bond, the organ-

ization and direction of a systematic scheme of fire-protection being assigned to a board of directors having power to levy the necessary assessments. The region embraced by this association was confined to the Coeur d'Alene watershed, which was divided into range-districts, the size of these depending on the fire-danger. The work of the rangers was supervised by a district chief, who in turn reported to a chief ranger, responsible to the board of directors. One great advantage secured by this co-operative scheme was that no unclaimed territory between limits was now left unpatrolled.

The example of this first association was promptly followed by the Pend d'Oreille, Potlatch and Clearwater Timber Protective Associations, located on contiguous watersheds, and the four formed a loose alliance for the exchange of ideas, called the North Idaho Forestry Association.

As the State of Idaho owned much timber land within the association's territory, the Fallon Law was passed in February, 1907, authorizing forest-owners to create fire-districts in which their rangers were given police power, and nominating the state as a forest-owner under the law. The state then joined the association on exactly the same basis as the private owners, paying the same assessment per acre for the maintenance of an adequate protective patrol. Mr. E. T. Allen, Forester for the Western Forestry and Conservation Association, commenting on this arrangement says: 'The merit of the Fallon Law is that the actual fire-fighting and patrol is done by those most competent by reason of practical local experience, without danger of political influence. The State gets the very best returns in protection for the money contributed, without the burden of detailed supervision. These Idaho associations have the most highly organized, liberally supported and efficient fire-organization in the United States.'

The following year the Washington Forest Fire Association was organized, covering all of western Washington and operating along similar lines to the Idaho associations. The State gave the wardens of this association police power, but did not contribute on any fixed basis as did the State of Idaho.

'At first,' says Mr. Allen, 'the object of these associations was the perfecting of field organization for better patrol and protection. But the movement enlisted public sympathy and had an educative influence, while the associations' voice, based on expert advice, influenced legislation.' So in 1909, the Idaho and Washington associations united to form the Western Forestry and Conservation Association, to extend the movement into adjoining states and to provide all the small associations with clearing-house facilities for improving field methods, public sentiment and legislation, or, in other words, to campaign alike against the careless lumbermen and the careless public. A professional forester was employed and the operating expenses of this head association were provided for by a *pro rata* assessment of the constituent associations. As a result of the efforts of this association, Oregon soon had several small associations, all affiliated to the Oregon Forest Fire Association, and about the same time was organized the Northern Montana Forestry Association, followed in California by the Redwood Fire Protective Association and the California Forest Protective Association.

These local associations in Idaho, Washington, Montana, Oregon and California all belong to the Western Forestry and Conservation Association, with a total membership of over four hundred lumbermen. The detailed working out of the protective plan is left with the individual associations, but the head forester outlines the general policy and determines the expense limit, subject to the approval of a directorate of five trustees, one elected by each state at the annual meeting. At this meeting every local association has equal voice regardless of the amount of its contributory assessment—a detail of administration in which these associations differ markedly from the St. Maurice Fire Protective Association, described later in this bulletin.

The total area controlled by the constituent associations is about twenty million acres, containing fully five hundred billion (500,000,000,000) feet of lumber, one-fifth

of the total timber wealth of the United States. They maintain about five hundred regular patrolmen and a shifting army of fire-fighters, and are building hundreds of miles of trails and telephone lines. In 1910—perhaps the worst year for forest fires in history—over five thousand five hundred and eighty fires were extinguished, the total loss being less than one-quarter of one per cent. The average assessment is between two and three cents per acre, though some of the Idaho associations assess themselves as high as fifteen cents an acre. Mr. E. A. Sterling, summarizing the situation, says: 'The whole policy is a systematizing of common-sense methods—telephone lines, trails, lookout stations, tool-caches and education being the essentials of forest fire protection. New features are largely administrative.'

The co-operative movement is spreading rapidly to the east and south. In 1910, the Northern Forest Protective Association was organized in the Lake States with a present membership of one hundred limit-holders, almost seven million acres receiving the benefit of patrol at a cost to the members of half a cent per acre.

In the eastern states, the most important timber-protective associations are the Kennebec Valley and the New Hampshire Timberland Owners' Associations, the latter of which is comprised of about thirty members with a patrolled area of about one million five hundred thousand acres, the average assessment being five-eighths of a cent per acre. Similar forest protective associations have more lately been formed in the southern states by mine-owners and other private individuals or corporations owning tracts of timberland.

RISE OF THE MOVEMENT IN CANADA.

In Canada, the credit of inaugurating this co-operative movement belongs to the lumberman of the St. Maurice Valley, Quebec, who, in the spring of 1912, organized the St. Maurice Fire Protective Association along similar lines to those already described, and in one short summer built up a fire-protective service second to none in Canada.

In May, 1908, the Laurentide Pulp and Paper Company, on the St. Maurice river, gave to Mr. Ellwood Wilson, Superintendent of its Forestry Division, permission to organize a fire-protective service, independent of that required by the Quebec Government, consisting of twenty-seven rangers, who covered about two thousand square miles of the company's limits, and about one hundred square miles of adjacent limits which had to be crossed in patrolling their own.

The fires thus prevented more than justified this increased expenditure, and Mr. Wilson conceived the idea of extending this service by obtaining the co-operation of the other timber-limit owners of the St. Maurice Valley, who as early as 1903 had already co-operated for the purpose of driving logs on that river. Accordingly, at the annual meeting of the St. Maurice Boom and Driving Association, in 1909, he proposed that all the limit-holders there represented should form a co-operative association to obtain economical and efficient fire-protection in the St. Maurice Valley. But, as the government regulations regarding fire-protection are not very severe on limit-holders in Quebec, this proposition met with little favour at that time, because of the increased expenditure necessitated by such a scheme and because each company, knowing how inefficient its own attempts at fire-protection had been in the past, was afraid to trust the management of such a scheme to any other company.

However, Mr. Wilson, backed by the Laurentide Company, succeeded in starting a co-operative association consisting of the owners of timber-limits along the right of way of the National Transcontinental Railway, one-third of the cost being paid by the Quebec Government, one third by the National Transcontinental Commission and the remaining third by the limit-holders in the association. This railway patrol was a success in every way, and during the period between 1908 and 1911 over three hundred and twenty-eight fires were extinguished, either on the right of way or on the adjacent limits. One hundred and ten of these were caused by locomotives, but a



Mr. Sorgius, Manager St. Maurice Fire Protective Association, on Inspection Trip.

Courtesy St. Maurice F.P.A



Group of Fire-rangers employed by St. Maurice Fire Protective Association.

Courtesy St. Maurice F.P.A.

large proportion was also caused by the settlers. These latter occurred mostly in the months of June and July, it being permitted under the Quebec law to use fire for the clearing of land during the summer months, except in very dry seasons.

This co-operative patrol had proved such a success that, in the spring of 1912, Mr. W. R. Brown, of the St. Maurice Industrial Company, La Tuque, Quebec, again brought up the proposition that a co-operative protective association be formed embracing all the limit-holders in the St. Maurice Valley. This time the proposition was accepted.

At the organization meeting, held in Montreal on March 2, 1912, sixteen limit-owners, either companies or private individuals, united to form the St. Maurice Fire Protective Association, whose holdings totalled seven million one hundred and fifty-eight thousand five hundred and seventy-three acres, for the efficient patrol of which its members agreed to tax themselves one-quarter of a cent per acre. This sum, paid quarterly in advance, amounted to \$17,900, to which the Quebec Government added \$3,000, as a considerable area of Crown lands received the benefit of this patrol. The railways also contributed to the maintenance of the railway patrol subsequently established.

The following officers were elected for the first year:-

President—Mr. Alexander McLaurin, Montreal.

Vice-President—Mr. W. R. Brown, of Berlin, N.H., and La Tuque, Quebec.

Manager and Secretary—Mr. H. Sorgius, of Three Rivers.

Mr. Brown, whose home is in New Hampshire, was thoroughly acquainted with the organization adopted by successful protective associations in the United States, and his knowledge was very valuable in drawing up the articles of agreement of the newly launched St. Maurice Fire Protective Association. By following the precedents established by the associations across the line, sources of possible friction were avoided and the basis secured for an economical and efficient patrol.

Articles of agreement were adopted at this meeting.* The object of the association, as stated in these articles, was the organization and establishment of a thoroughly efficient system of protection from fire whereby prosecution could be secured of all transgressors of the fire laws and regulations, and co-operation be effected between the owners of all timberlands in the St. Maurice drainage basin. The securing of legislation and the spread of education regarding conservation in general were all included among the objects. All such timberland holders were to be eligible for membership on payment of annual dues of one-quarter of a cent per acre; these dues were to be paid quarterly in advance so as to insure the availability of funds for the season's operations. Five directors, including the president and vice-president, were to be elected each year by a majority vote of the members at the annual meeting, their duty being to carry out the plans outlined at this meeting and report on their work at the next annual meeting. They were also empowered to call special meetings of the association when deemed necessary. The manager and secretary was to have charge of all administrative details, including the hiring and discharging of rangers, and also the handling of the association's funds, all expenditures being subject to a monthly audit by the board of directors. His further duties were to consist in the securing of appointment by the government of the fire-rangers for the members, and the supervision of these rangers, together with the forwarding of such reports as might be required by the government. Provision was made for the setting aside of special appropriations from the funds of the association for the construction of trails, telephone lines, tool-caches and lookout stations, together with detailed maps of the fire-districts, and also for the creation of a reserve fund and the promotion of co-operation. All members of the association were to give written authority to the fire-rangers to use all men on the drives or working in woods, to fight fire when necessary.

* The Articles of Agreement as originally adopted are given in full in the appendix.

Mr. H. Sorgius, the experienced forester who was appointed manager, took up his duties on the 20th of March, and on April 6 he submitted a working-plan to the directors which divided the territory into three divisions, each being subdivided into several ranger districts, while the railway was divided into four patrols. A list of necessary equipment was also presented, along with a total estimate of the cost. With some slight modifications as to the salaries to be paid, the manager's recommendations were adopted.

The organization thus outlined consisted of a manager, three inspectors and fifty rangers who reported for duty during the first week in May. Each inspector had charge of a division and it was his duty to see that the rangers in his division patrolled their beats, posted fire-notices and cut or cleared the necessary trails, portages and firelines.

The rangers receive their legal appointment from the Quebec Government in order that they may have police powers under the statutes of Quebec, but they are virtually chosen by the manager of the association in order that men may be obtained best fitted, through physical qualifications and familiarity with the locality, to carry on the patrol. Their usual wage averages fifty dollars a month, out of which they board themselves, doing so for about fifty cents a day. They make written weekly reports, which are checked by the district inspector, who forwards them with his own report to the head office of the association at Three Rivers, from whence they pass on to the Department of Lands and Forests at Quebec.

The patrolled area is described in the Geological Survey reports as being 'very rough and hilly, with sand plains and swamps between the hills. The rocks throughout the whole country are gneisses, granites and schists.'

The innumerable lakes resulting through blockage of the drainage systems during the glacial period necessitates a canoe patrol on the limits lying in the old Archean area, and seventeen canoes, each manned by two competent men fully equipped for fighting fires, traverse the waterways in this region. On the sandy flood plain of the upper St. Maurice, where scattered settlers seek scant subsistence, these are supervised by three rangers, who cover their beats on horseback. The National Transcontinental and the Quebec and Lake St. John Railways are patrolled by rangers on motor-speeders, five of these being in operation during the danger season, each averaging over thirty-two miles a day and costing about half a cent per mile to operate. Engine-screens and fire-pans are examined at regular intervals, and the railways induced to make the necessary repairs. It is worthy of note that trains at night caused no fires, whereas in the daytime they were continually setting fire to the adjacent forest, because engines, when under heavy draught on up-grades, will throw sparks in spite of the spark-arresters required by law.

In his report on the season's work, the manager states that ninety-seven fires occurred, all except four of which were extinguished by the rangers without calling in extra labour. Fifty-two of these fires occurred on the railway right of way, and forty were on the limits or in the adjoining settlements, which figures indicate clearly the two chief causes of fire in this region. No fires were caused by Indian, nor by the river-drivers and logging-crews, for the lumbermen who were themselves paying the cost of patrol took more pains to impress on their men the necessity for care than they might otherwise have done.

The fish and game clubs in the St. Maurice Valley also assisted in the prevention of fire by warning their guides and guests to observe every precaution, and no fires occurred in their territories except those set by poachers.

During the season of 1912, about five hundred and twenty-five miles of trails and portages were cut or cleared, and three lookout stations established with telephonic connection with the existing telephone lines along the railway and between the settlements.

This detailed description of the organization and operations of the St. Maurice Fire Protective Association during its initial year indicates the remarkable rapidity with which economical and efficient patrol can be secured over large areas, when the



Erecting Lookout Station Tower.

Courtesy St. Maurice F.P.A.



View from Lookout Station.

Courtesy St. Maurice F.P.A.

work is undertaken in the right way. Neither in the United States nor elsewhere can any one protective association compare with that on the St. Maurice, either in area or in the cheapness of effective patrol.

Conditions, perhaps, favour the St. Maurice Association in attaining this result to a greater extent than they do similar associations in the United States. The holdings of the constituent limit-holders on the St. Maurice form a very compact area, as is seen by the map accompanying this report, and this means cheapness of patrol, as does also the low scale of wages paid in Quebec for patrol work. Moreover, in the proximity of the settlements, the available supply of emergency labour makes possible a smaller permanent patrol, while in the backwoods, which are very inaccessible and almost impenetrable, except by canoe, practically the only danger of fire arises from the infrequent travellers of the water-routes, and hence only the more important of these routes require patrol. Even in the neighbourhood of the settlements, the fire-dangers are not so great as it might be, for the French-Canadian *habitants*, while usually careless are yet more subject to control than the lawless element on the rugged edges of civilization in the West. Especially is the Roman Catholic priest or curé influential in Quebec, and a warning against the setting of fire, spoken from the pulpit of the church, is seldom disregarded.

The law, too, backs the fire-fighters in Quebec better than in most western states, for the conviction of incendiaries can be secured both under the Forest Fire Act of Quebec and the Criminal Law, the penalties imposed by this latter for carelessness with fire being quite severe. The railways are also held to strict account by law, for the General Order of the Public Utilities Commission of Quebec in respect to the Protection of Forests from Fires by Railways, which was passed on August 27, 1912, is as effective in obtaining adequate protection of the right of way of provincial railways as is Order No. 16570 of the Board of Railway Commissioners of Canada in securing similar protection on the transcontinental lines.

The original taxation of only one-quarter cent per acre remained unchanged in 1913, but the association has now a larger membership and its assessment, irrespective of outside contributions, now amounts to something over \$10,000. To this the Quebec Government will add \$3,000, making over \$22,000 available for patrol and improvement work. That this expenditure secures efficient patrol is proved conclusively by the fact that the 275 fires occurring in the summer of 1913 were all extinguished by the fire-rangers of the association before reaching green timber.

The improvement work during 1913 has consisted mainly in extending the telephone lines and in establishing additional lookout towers, seven of which have already been erected. Greater attempts have also been made this year to educate the settlers and secure their co-operation in fighting fire or in avoiding the necessity of so doing. Where peaceful persuasion is of no avail, the 'iron hand of the law' soon enforces respect for the law. In the summer of 1913 over fifty settlers were prosecuted for incendiarism and fined from fifteen to twenty-five dollars apiece, so it is likely that wilful negligence from this source will soon be a negligible factor in the cause of forest fires—and settlers are the only important cause of forest fires remaining to be brought under control in this region.

At the annual meeting of the St. Maurice Fire Protective Association, held early in 1913, the following officers were elected for the year:—

President—Joseph Dalton, Three Rivers.
 Vice-President—S. L. de Carteret, La Tuque.
 Manager and Secretary—H. Sorgius, Three Rivers.

The following list shows the membership, acreage and assessment of the association for the year 1913:—

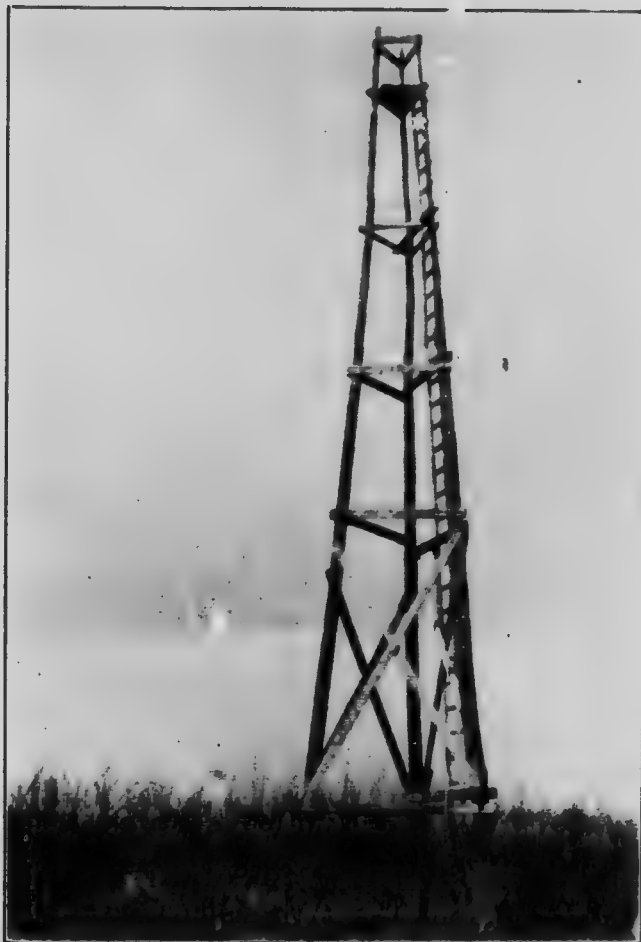
	Area. Sq. Mi.	Assessment per Mi. \$ c.	Total Assessment. \$ c.
Quebec & St. Maurice Ind. Co.....	2,777.75	1 00	4,444 40
St. Maurice Lumber Co.....	2,581.00	1 00	4,061 00
Laurentide Co.	2,585.00	1 00	3,852 00
Gros Falls Co.	1,033.00	1 00	1,694 80
Wayagamack P. & P. Co.....	1,135.00	1 00	1,816 00
Belgo Can. P. & P. Co.....	997.50	1 00	1,596 00
Union Bag & Paper Co.....	479.00	1 00	766 40
Wm. Baldwin	97.00	1 00	155 20
J. A. Rousseau.....	97.00	1 00	155 20
R. L. Turner.....	90.00	1 00	144 00
G. H. Dansereau.....	50.00	1 00	80 00
Reed & Co.....	50.00	1 00	80 00
Ellwood Wilson	49.00	1 00	78 40
Wm. Ritchie	47.50	1 00	76 00
E. M. MacLaren.....	25.00	1 00	40 00
Fawke Tingling & Drummond.....	24.00	1 00	38 40
MacDonnell & O'Brien.....	10.00	1 00	30 40
	11,936.75		19,098 80

DIFFERENCES IN METHOD.

While in general, the St. Maurice Association corresponds very closely with those of the West in organization and field operations, there are one or two significant differences. In both cases, the policy is determined by a board of directors, but the method of electing these directors is very different. In the western associations, each member has but one vote, either in the election of directors or in voting on policy. In the St. Maurice Association, on the other hand, each member's voting power depends directly on the size of his holdings, ten square miles constituting a 'share,' and each 'share' entitling the owner to one vote. The reason for such a division of power is obvious by glancing over the membership list. Ten out of the seventeen members control only 549.5 square miles of the 11,936.75 square miles patrolled. Thus if each member had an equal vote, the control would be in the hands of these small holders, and as the chance of fire occurring on their small sections is proportionately less, the inducement to provide for adequate fire-protection would not be so great, and they would probably lower the assessment, and with it the efficiency of the protection.

Another important difference from most of the western associations has resulted from the experience gained in 1912, namely, the present policy of the St. Maurice Association of charging the association with not only the expense of the general patrol, but also with the cost of actual fire-fighting on individual limits. Previously the plan was to make the limit-holder pay the extra cost, but this has been found cumbersome in operation, and the common interest in the prevention of fire is sufficient to prevent individual carelessness.

These differences in organization are the result of different ownership conditions, but, as a result of differences in forest and topographic conditions, there are also differences in operating methods between the east and the west. In the five western states already spoken of, the open character of the forest permits of horseback patrol and makes possible the installation of trails, telephone-lines and fire-lines at a much smaller cost than in northern Quebec, where a few trunk lines are all that have been established as yet. Moreover, the mountain peaks in the west furnish natural lookout stations from which a wide area of the country may be watched, while in Quebec the low, wooded hills necessitate the erection of high scaffolding in order to obtain any extensive range of vision.



A Lookout Tower on a Dominion Forest Reserve.

ESSENTIALS IN CO-OPERATION.

The essential features for the formation of any efficient fire protective association as outlined by Mr. E. A. Sterling, President of the American Wood Preservers' Association, and director of the American Forestry Association, are as follows:—

1. *Flexibility in organization so that the field force can be increased promptly in emergencies.*

The proximity of settlements to some parts of the patrolled area of the St. Maurice Association considerably reduces the cost of permanent patrol in these regions.

2. *Availability of funds to carry on the work.*

The St. Maurice Association provides for this by having an emergency fund for the cash payment of temporary fire-fighters and by having the annual assessment paid quarterly in advance.

3. *Systematic patrol.*

In this connection, Mr. H. S. Graves, Chief Forester of the United States, says: 'To prevent forest fires, main reliance should be placed, not on punitive measures, but on an organized, disciplined and protective force under a technically trained forester, regularly employed in watching for fires and cutting down the causes of fire.'

4. *Prompt action in fighting fires which start.*

As 'a stitch in time saves nine,' so a ranger close at hand when a fire has just started can do what nine rangers or even ninety-nine may fail to do later, namely, put out the fire. The greatest aid in securing prompt action is a system of lookout towers, telephone lines, and, where possible, trails.

5. *Preventive measures, such as burning dangerous slash, keeping rights of way cleared, &c.*

In Canada, the railways are required by law to keep their rights of way cleared, but no legislation has yet been enacted in Canada requiring the lumbermen to burn slash, though tentative attempts have been made in Ontario and British Columbia. The lumbermen in Washington and Oregon are required by law to burn their logging slash, and do so satisfactorily at a cost of from fifteen to fifty cents an acre. While conditions in Canada in many cases do not justify such a procedure at present, it is practically certain that the lopping of tops will soon be extensively practiced, for it materially reduces the fire risk. It is not improbable that the St. Maurice and other protective associations will undertake this practice themselves before the government takes steps to enforce it. The McLeod Lumber Company recently carried on some interesting experiments in slash burning and fire-protection on their limits in California. The work was put in charge of the United States Forest Service and the results were published in a government bulletin. They found that protection of cut-over land from fire by burning slash, installing telephone lines, cutting trails and maintaining adequate patrol would pay for itself by a small margin in prospective future yields, but that such protection was chiefly justifiable because by protecting cut-over lands the mature timber was also protected.

6. *Educative work among all classes.*

A great deal of such work had been done in the United States, especially by the Western Forestry and Conservation Association, and the results obtained have fully justified the expense of this educational campaign. Mr. E. T. Allen has been chiefly instrumental in carrying on this work, and under his direction thousands of circulars,

folders and stickers are issued. The summer folders of every transcontinental railway in the territory contain half a page of copy furnished by this western association, and every public library in the west and every technical forestry school in the United States has a bound book of forest economics prepared and put there by the Western Forestry and Conservation Association. The school children have been supplied with little picture books containing the story of the trees, and each child in the five western States is supplied with a sanitary paper drinking cup, which, when properly folded, shows pictures of forest fires, inscribed with easily remembered principles of protection. The association is also endeavouring to interest railway employees by appealing to the Brotherhood of Locomotive Engineers and to the Firemen's Union, for, if the sympathies of these men can be enlisted, the danger of fire from broken screens and faulty fire-pans on locomotives will be greatly reduced.

7. *Co-operation between the various federal, state, corporate and private interests concerned.*

This is the key of the forest-fire problem, and only when co-operation is universally secured on this continent will the danger from forest fires cease to exist. It is because the protective associations of the lumbermen have done so much towards securing this co-operation that their further formation is so desirable. By co-operation among themselves, irresponsibility was obviated in neutral territory where responsibility was hard to fix.

RESULTS OF CO-OPERATION.

By fostering the co-operative spirit in the settlers on the patrolled areas, the ill-feeling generally prevalent towards the lumbermen was dispelled, and the necessity for punitive measures and intensive patrol was largely removed. The results of obtaining the settler's co-operation with the rangers, as Mr. Allen points out, 'are most truly measured, not by the fires put out, but by the absence of fires to extinguish.' The Forest Fire Department of the Michigan Hardwood Manufacturers' Association goes so far as to send personal letters, each spring, to all residents in patrol districts asking for co-operation in fire-fighting.

Co-operation with the railways secures material assistance in the prevention of fires along the rights of way. In the St. Maurice Valley, the railways furnish free transportation to the rangers and allow the association to patrol their lines with motor-speeders. They also furnish men to assist in fighting fires near the right of way, and are usually careful to observe the law respecting spark protectors, fire-screens and ash-pans.

Co-operation between the federal and state government and the protective associations has resulted in better laws and larger grants to fire protection. The influence of the Western Forestry and Conservation Association was instrumental in causing Washington and Oregon to pass new forest codes and to increase their annual appropriation for fire protection from \$2,300 to \$68,000. Federal co-operation was secured in the United States by the Weeks Bill, passed February 15, 1911, authorizing the Secretary of Agriculture to co-operate with state or private individuals or associations for the protection from fire of the forested watersheds of navigable streams, and appropriating a sum of \$200,000 for this purpose. As a result of state and federal co-operation with these protective associations, duplication of patrol is avoided and greater efficiency of service secured in dangerous regions.

ADVANTAGES OF CO-OPERATION TO THE STATE.

In Canada, the St. Maurice Fire Protective Association furnished the state with an opportunity to co-operate with private enterprise, and it has done so by contribut-

ing a lump sum to the association's funds, which contribution, in proportion to the provincial land obtaining the benefit of patrol, is almost equivalent to the quarter of a cent per acre assessment levied by the lumbermen on themselves. The Quebec Government also aids by delegating police power to the fire-wardens appointed by the association, while both provincial and federal governments co-operate with the association in securing fire protection along railway rights of way.

There is another reason besides that of co-operation why the government should encourage these protective associations among lumbermen, and it is because of the increased efficiency of patrol when administered by private individuals or associations. Up to the present, the government, provincial or federal, has organized and administered the work of fire protection, the lumbermen being assessed according to the size of their limits. Under the association method, on the contrary, the lumbermen organize and operate the patrol, assessing themselves according to their acreage, and, as seen in the St. Maurice Valley and in Idaho, extending the benefits of the patrol to government land on the payment by the government of a similar assessment. With the extension of these co-operative associations, all the forested land in Canada, public and private, would ultimately come under such patrol, political influence would be eliminated and the most economical and efficient system of protection would be secured, while the State Forest Service, released from the burden of the administration of this work, would be free to devote itself to other and more advanced phases of forestry.

INFLUENCE OF TAXATION ON CO-OPERATION.

Adequate fire protection is the first step in the practice of forestry, and that the lumbermen are willing to co-operate so as to succeed in this step, and succeeding steps, is very evident from the progress already made. But the present system of taxation of timber limits stands in the way of such progress. In some cases in Canada where the ground rent is very high, ranging as high as \$140 per square mile, the lumbermen are induced by this excessive taxation, not to practice conservative lumbering or install adequate systems of fire protection, but rather to cut over their limits as quickly as possible in order to escape this annual tax which, instead of being based on the sale-value of the cleared land only, is also based on the value of the standing timber. At a recent meeting of the National Conservation Commission, it was resolved that 'An annual tax upon the land itself, exclusive of the timber, and a tax upon the timber when cut, is well adapted to actual conditions of forest investment and is practicable and certain.' Such a law is in force in Minnesota, and legislation embodying similar principles has recently been enacted in Pennsylvania. Such a method of taxation is favoured by the lumbermen and pulp manufacturers, for the permanent and costly mills now being erected indicate a desire on the part of these men to operate their limits so as to secure continuity of supply. But to accomplish this purpose, fire must be kept out of the timber, and if by altering the present system of taxation the government makes possible conservative lumbering on timber limits, it will, at the same time, also secure, at no cost to itself, adequate protection from fire on these same limits.



Fire-rangers following Transcontinental Construction Train with Gasoline Speeder. Courtesy St. Maurice F.P.A.



Forest Fire on Transcontinental Railway Extinguished by St. Maurice Forest Protection Association. Courtesy St. Maurice F.P.A.

APPENDIX.**ARTICLES OF AGREEMENT OF ST. MAURICE FIRE PROTECTIVE ASSOCIATION.****NAME.**

The Association shall be called the St. Maurice Limit Holders' Protective Association. It shall be incorporated under the laws of the Province of Quebec, and have its principal office at La Tuque, Province of Quebec.

OBJECT.

1. To formulate, install and operate a thoroughly efficient system of protection from fire, including all the timberlands in the St. Maurice Valley.
2. To furnish emergency supervision in the fighting of fire until relieved by the land-owner, and thereafter to operate with him.
3. To prosecute transgressors of the fire laws and regulations.
4. To promote legislative and educational measures to conserve forest resources in general.
5. To co-operate with the Provincial government in the protection of forests and the maintenance of forest reserves.

MEMBERSHIP.

Any corporation, partnership, or person owning or leasing timberlands on the St. Maurice river, or its tributaries, is eligible to membership, and shall be admitted on payment of the dues to date for the current year. Notice of withdrawal from the Association must be sent to the Board of Directors on or before the day of the annual meeting, and unless such withdrawal is received any member will be legally liable for all dues and costs of fighting fires on land of such member for the current year.

DUES.

The annual dues shall be one-fourth cent per acre of timberland owned or held under license, payable quarterly in advance; the first payment to be made within two weeks after the annual meeting of the Association.

ANNUAL MEETING.

The annual meeting shall be held at the time and place of the annual meeting of the St. Maurice Log Driving Association, or at such other time and place as the Board of Directors may decide.

BY-LAWS.

(Directors) The affairs of the Association shall be managed by a board of fire directors, the president, vice-president and three others, who shall be members of the Association and chosen by a majority vote at the annual meeting. They shall be elected for one year, and shall act until replaced. Three directors shall constitute a quorum. Any two of the directors may call a meeting of the board whenever it may be deemed necessary, provided that at least five days' notice is given to the other members of the board at their places of business.

Questions shall be decided by a majority vote of the directors. The Board of Directors shall hire a manager and a secretary-treasurer. They may also limit the scale of wages paid to all other employees of the Association as they may deem advisable. The directors shall have the power to call special meetings of the Association when deemed necessary, shall supervise expenditure of all moneys, bond the secretary-treasurer (interest on bond to be paid by the Association), present a complete statement of all receipts and disbursements, assets and liabilities of the Association at its annual meeting for approval, also present a report of the work accomplished during the past year, and the plan of operation for the ensuing year.

PRESIDENT.

The president of the Board of Directors shall preside at all meetings of the Association, and of the Board of Directors. In case of a tie vote he shall cast the deciding ballot.

He shall see that all actions or resolutions of the Association and Board of Directors are put into effect; shall have general supervision of the work of the manager, and shall approve bills for payment.

VICE-PRESIDENT.

In the absence of the president the vice-president shall act in his stead, having the same duties and power.

FORESTER AND SECRETARY-TREASURER.

The manager shall supervise the work of the secretary-treasurer, who shall keep the minutes of all the meetings of the Association and the Board of Directors. He shall keep a set of books showing the receipts and disbursements, assets and liabilities, inventory of equipment, list of employees, wages paid, &c. At the end of each month he shall make a statement and trial balance of his accounts, and send copies of each to the directors for their perusal before the tenth of the following month. He shall sign all checks, pay all bills approved of by the president, receive all moneys of the Association and deposit same, whenever possible, on the same day and in the same form as received, in the bank chosen for the purpose by the Board of Directors, the account being in the name of the Association.

All moneys paid out shall be in the form of a check, except when absolutely unavoidable. He shall, under the direction of the Board of Directors, have complete charge of all protective work and fire fighting done in the interest of the Association. In appointing fire-rangers preference shall be given to such employees of members of the Association as they may suggest, when in the judgment of the manager they are considered efficient and adapted to the work. The manager shall, however, hire and discharge at his discretion.

The Secretary-Treasurer shall be the authorized representative of the individual members of the Association to collect the lawful recompense due from the government for fighting fire on any of the land of the Association. He shall also secure all government appointments of fire-rangers for the members, and collect and send in the reports required by the government and keep members advised as to all government regulations, requirements and privileges.

FIRE-PROTECTIVE WORK.

The Association shall assume for the individual members all of the obligation of fulfilling the fire-protective regulations required by the government.

Fire-protective work shall be carried out under the following general heads, for which special appropriations shall be set aside out of the funds of the Association as follows:—

1. Appointment and placing of district chiefs by the manager, who shall have jurisdiction over the fire-rangers within their districts, and the organization and administration of all protective work and fire fighting.
2. The installation and maintenance of telephone lines.
3. The compilation of suitable maps of each district to facilitate fire fighting therein, showing location of tools, roads, trails, streams, lookouts, telephone lines and ownership, and the distribution of uniform copies thereof to all agents of the Association.
4. Placing of fire-rangers on definite routes to cover largest area efficiently.
5. The distribution of fire-fighting apparatus.
6. Construction of lookout stations for the early apprehension of fire.
7. Building trails.
8. Perfecting organization and establishing systematic reports.
9. Promoting co-operation between:—
 - (a) Provincial and town authorities.
 - (b) Managers and railroads, telephone and telegraph lines.
 - (c) Adjacent logging operators.
 - (d) Fishing and Game Associations, &c.
10. The creating of a reserve fund for the immediate and emergency fighting of fires which may be discovered upon the lands of the Association, and which will need attention until the land-owner can be advised thereof and respond.

EMERGENCY FIRE-FIGHTING.

Emergency fire-fighting shall be carried on by the fire-rangers under the direction of the district chief and manager with the funds set aside for the purpose, to their best ability and judgment, until such time as relieved by the owner, and all expense incurred therefor shall be paid by the members or member upon whose land such fire has occurred, according to a statement sent to them properly audited by the secretary-treasurer and confirmed by the president.

The wages, however, of all district chiefs and fire-rangers shall be paid out of the funds of the Association, and shall not be reckoned in the cost of fighting fire.

All members of this Association shall give written authority to the fire-rangers to use all men in drives or working in woods to fight fire when necessary. As soon as possible after being notified the owner shall either assume the responsibility of adequately fighting the fire, or shall supply sufficient and immediate funds to the Association, which will continue to handle the fire to the best of its judgment and ability.

In case of the Association fighting the fire an itemized account of all sums expended out of the emergency fund and from all moneys supplied for the purpose by the member upon whose land the fire has occurred, shall be immediately rendered to him, and any balance due the Association shall be paid within one week thereafter.

ENFORCEMENT OF LAW.

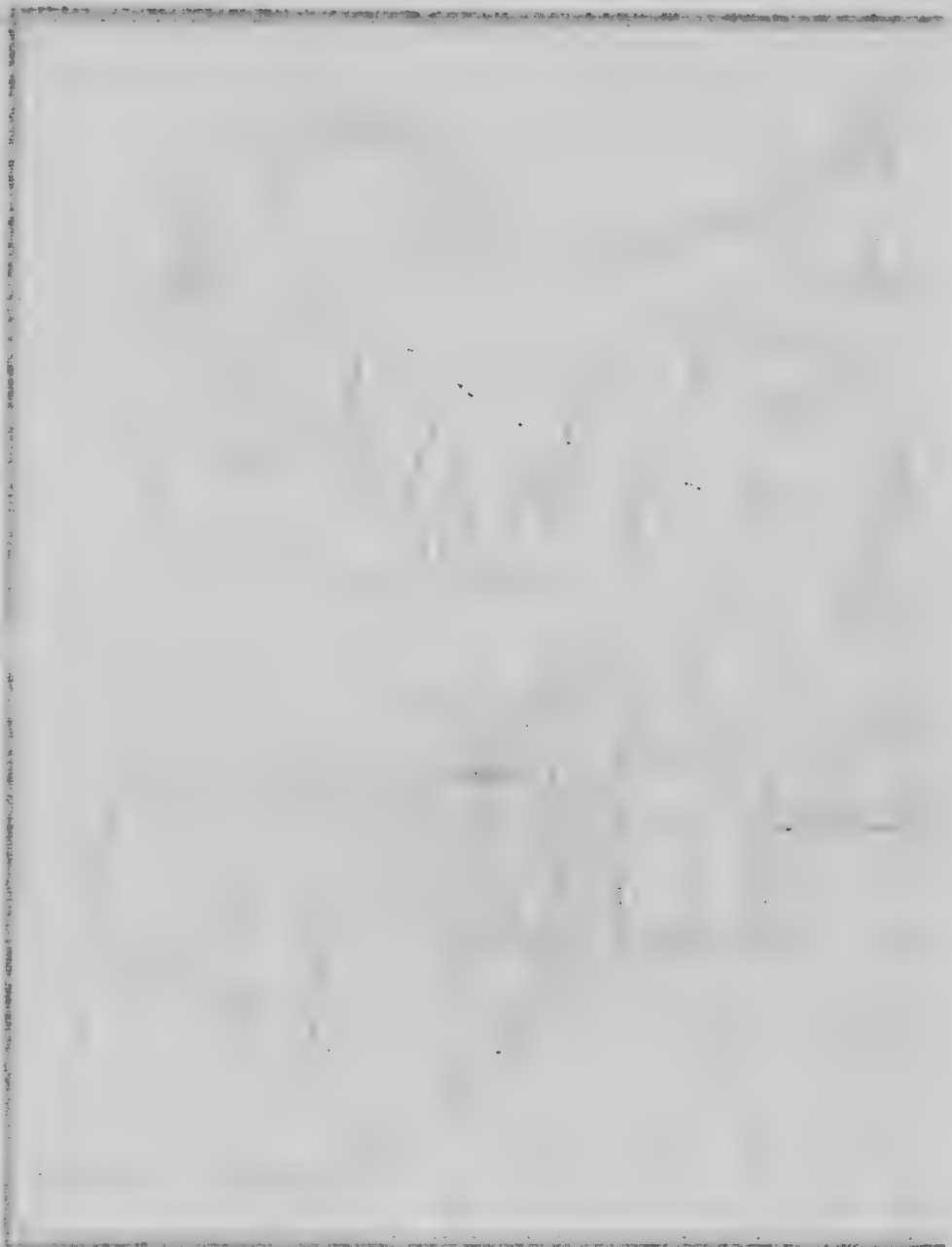
Through the fire-rangers duly appointed by the government, the Association shall enforce the laws of the province in regard to the setting of fires, burning of brush, &c.



A Temporary Lookout Station.

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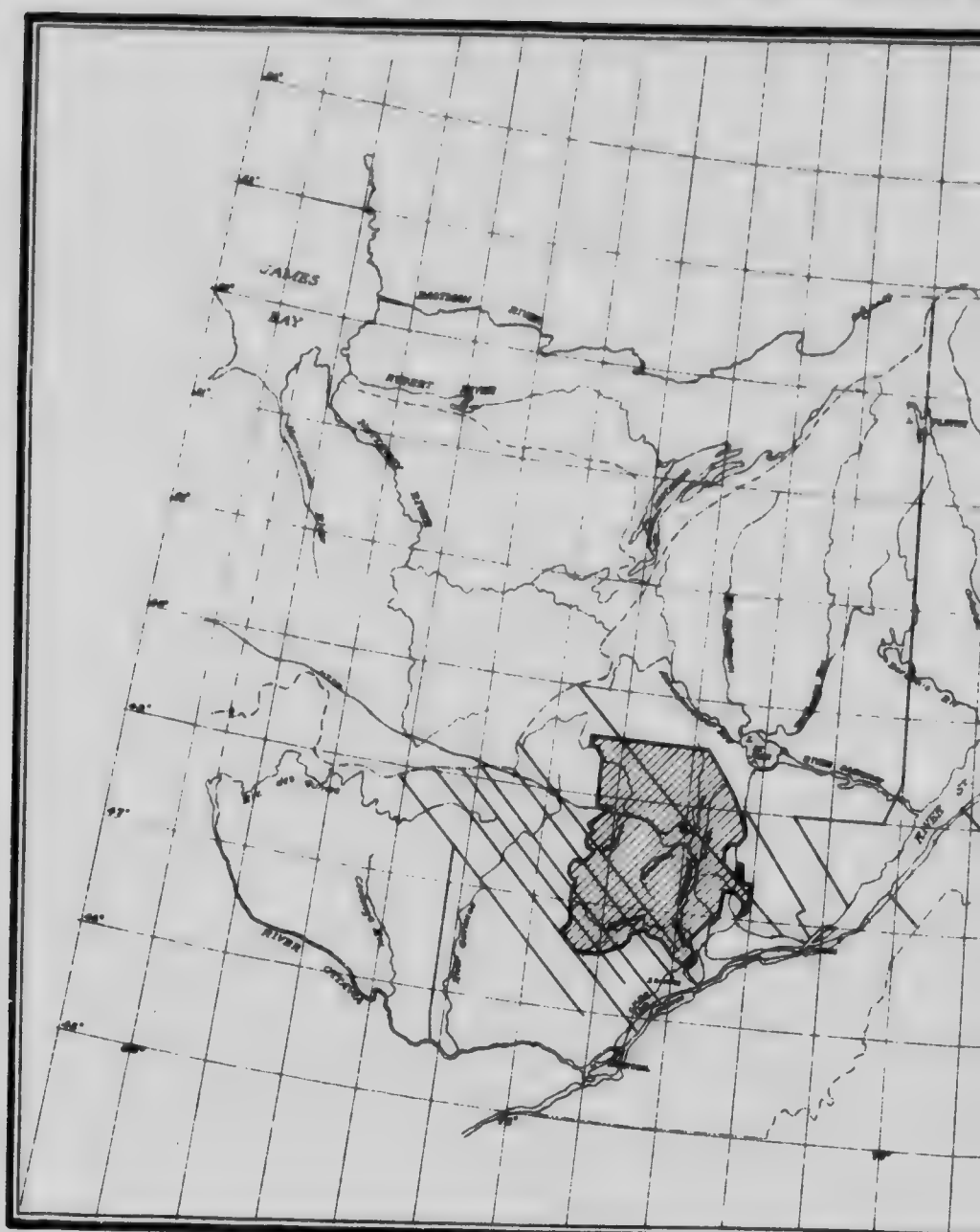


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SHOWING TERRITORY

ST. MAURICE FIRE

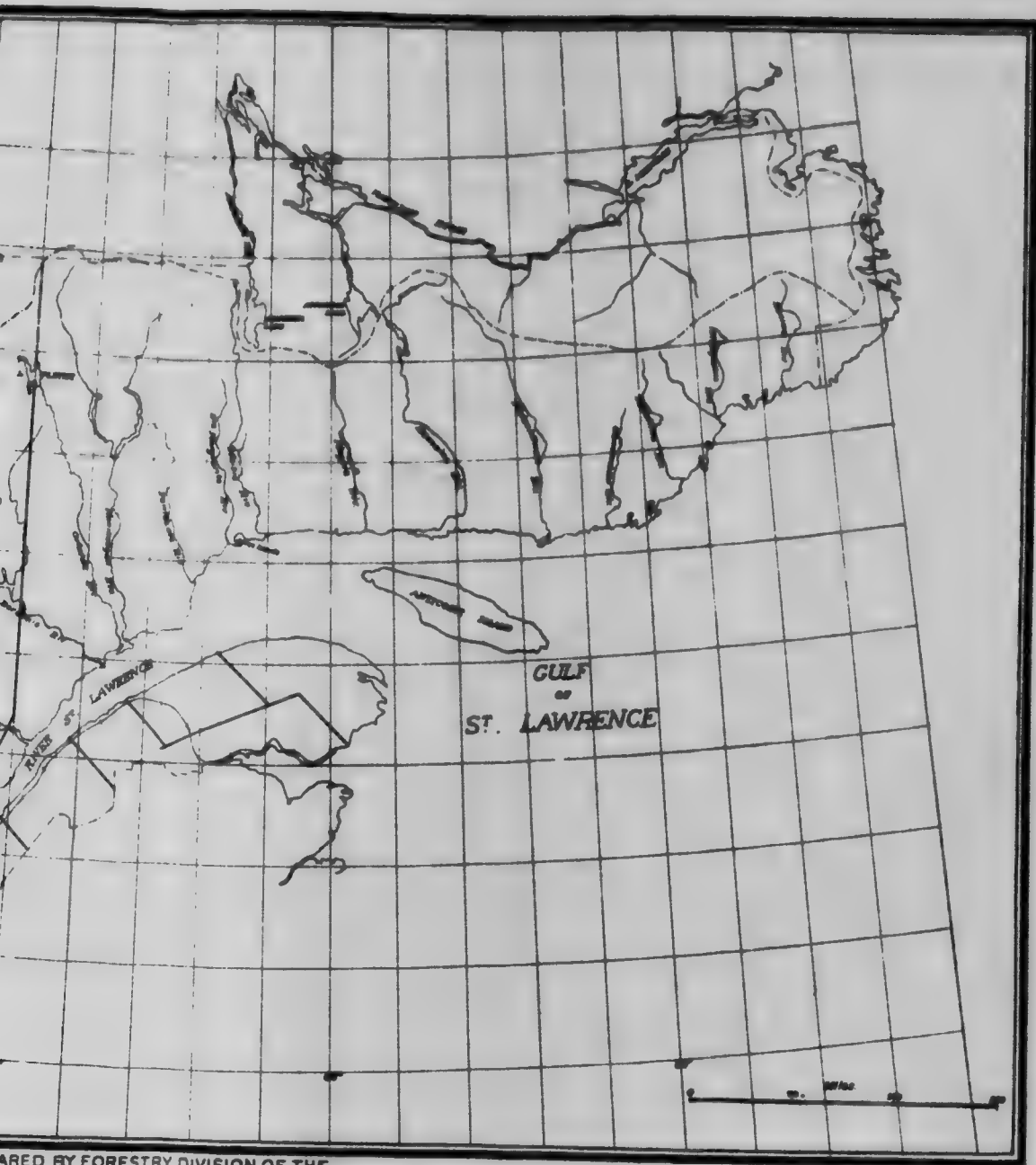


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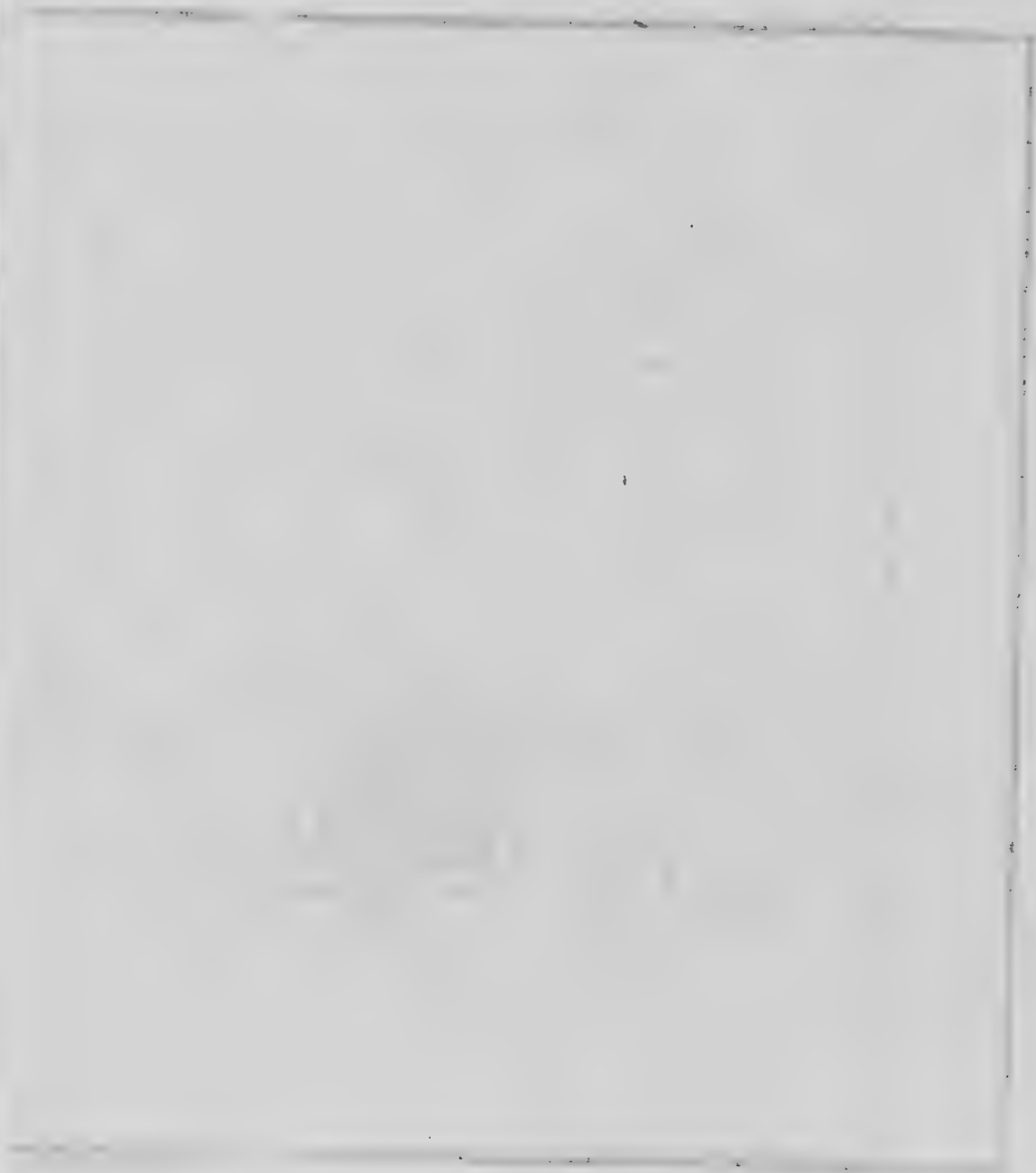


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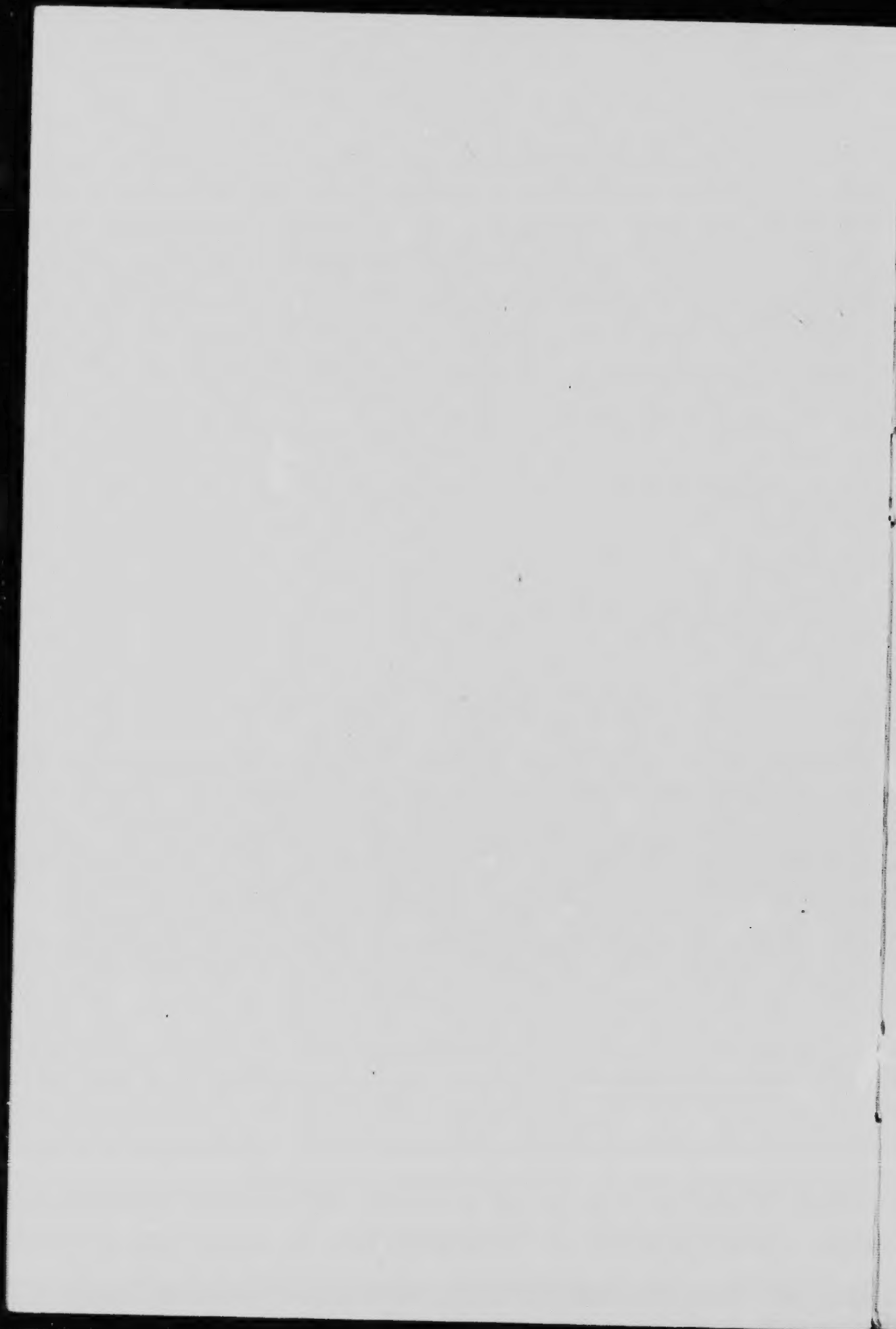
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 " 25. Forest Products of Canada, 1910: Lumber, Square Timber, Lath and Shingles. (Out of print.)
 " 26. Forest Products of Canada, 1910: Pulpwood. (Out of print.)
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 " 31. Forest Products of Canada, 1911: Tight and Slack Cooperage.
 " 32. The Turtle Mountain Forest Reserve.
 " 33. Forest Conditions in the Rocky Mountains Forest Reserve.
 " 34. Forest Products of Canada, 1911: Lumber, Square Timber, Lath and Shingles.
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 " 41. Timber Conditions in the Little Smoky River Valley (Alta.) and Adjacent Territory.
 " 42. Co-operative Forest Fire Protection.